IN THE CLAIMS

Please amend claims as follows:

1. (Previously Presented) A method comprising:

receiving input data; and

performing multi-scale unsharp masking on the input data using different scale dependent parameters for different scales selected based on the source of the input data.

2. (Previously Presented) A method for processing input data comprising:

decomposing the input data into a plurality of decomposition levels by applying a wavelet transform to the input data; and

modifying coefficients in at least two of the plurality of decomposition levels, to sharpen or smooth the coefficients, by scaling coefficients in the at least two decomposition levels using different scale dependent parameters for each of the decomposition levels.

3. (Original) The method defined in Claim 2 wherein the input data comprises image data.

4. (Original) The method defined in Claim 2 wherein only wavelet coefficients are scaled.

5. (Original) The method defined in Claim 2 wherein modifying coefficients comprises multiplying each coefficient in one of the decomposition levels by a first scale dependent parameter and multiplying each coefficient in another of the decomposition levels by a second scale dependent parameter.

6. (Previously Presented) A method for processing input data comprising:

decomposing the input data into a plurality of decomposition levels by applying a wavelet transform to the input data; and

modifying coefficients in at least two of the plurality of decomposition levels by scaling coefficients in the at least two decomposition levels using different scale dependent parameters for each of the decomposition levels, wherein each of the different scale dependent parameters is determined according to the following formula:

$$\mu_j = 2^{j\alpha}$$

where the value of α indicates whether sharpening or smoothing is applied to coefficients and j indicates the scale.

7. (Original) The method defined in Claim 6 wherein sharpening is applied to coefficients if α is less than zero and smoothing is applied to coefficients if α is greater than zero.

8. (Previously Presented) The method defined in Claim 2 wherein modifying coefficients results in smoothing of coefficients for scale dependent parameters greater than a transition value and results in sharpening of coefficients for scale dependent parameters less than the transition value.

9. (Original) The method defined in Claim 8 wherein the transition value is 1.

10. (Original) The method defined in Claim 2 wherein the transform comprises a critically sampled discrete wavelet transform.

11. (Original) The method defined in Claim 2 wherein the transform comprises an overcomplete discrete wavelet transform.

12. (Original) The method defined in Claim 2 wherein the transform comprises a complex wavelet transform.

13. (Original) The method defined in Claim 2 wherein the transform comprises a critically sampled wavelet packet transform.

14. (Original) The method defined in Claim 2 wherein the transform comprises an overcomplete wavelet packet transform.

15. (Original) The method defined in Claim 2 wherein decomposing the image data comprises applying a transform to the input data wherein the transform comprises an overcomplete transform for selected subbands.

16. (Original) The method defined in Claim 2 further comprising selecting the scale dependent parameter based on knowledge of the input data and knowledge of the image source.

17. (Original) The method defined in Claim 16 wherein the knowledge of the image source comprises a model point spread function of the image source.

18. (Original) The method defined in Claim 16 wherein the knowledge of the data comprises an indication the data contains step edges.

19. (Original) The method defined in claim 16 wherein selecting the scale dependent parameter is based on an estimate of decay of wavelet coefficients across scales.

20. (Original) The method defined in Claim 2 further comprising performing an inverse transform on coefficients after scaling has been performed.

21. (Original) The method defined in Claim 2 further comprising denoising after applying the wavelet transform.

22. (Original) The method defined in Claim 21 further comprising performing denoising as part of scaling coefficients by multiplying all coefficients in one of the decomposition levels above a predetermined threshold and setting other coefficients to a value near zero.

23. (Original) The method defined in Claim 22 wherein the value is zero.

24. (Previously Presented) The method defined in Claim 2 further comprising performing denoising as part of scaling coefficients by reducing all coefficients by a predetermined amount to a value near zero and then multiplying all coefficients in one of the decomposition levels above a predetermined threshold and reducing all coefficients by a predetermined amount to a value near zero.

25. (Original) The method defined in Claim 24 wherein the value is zero.

26. (Original) The method defined in Claim 21 further comprises coloring noise that remains after scaling coefficients.

27. (Original) The method defined in Claim 2 wherein the different scale dependent parameters are based on desired smoothness and sharpness.

28. (Original) The method defined in Claim 2 further comprising renormalizing coefficients.

29. (Original) The method defined in Claim 28 wherein renormalizing coefficients comprises applying a scalar to coefficients in at least one decomposition level.

30. (Original) The method defined in Claim 28 wherein renormalizing coefficients is performed as part of scaling coefficients by multiplying all coefficients in one of the decomposition levels by a scale dependent parameter chosen to achieve renormalization.

31. (Original) The method defined in Claim 28 wherein renormalizing coefficients is performed as part of scaling coefficients by computing a range of wavelet coefficients before rescaling, performing rescaling, and then scaling modified coefficients back to the range before rescaling.

32. (Original) The method defined in Claim 2 wherein the scale dependent parameters comprise monotonic functions.

33. (Original) The method defined in Claim 2 further comprising classifying wavelet coefficients into types.

34. (Original) The method defined in Claim 33 wherein the types comprise text and background.

35. (Previously Presented) A method for processing input data comprising:

decomposing the input data into a plurality of decomposition levels by applying a wavelet transform to the input data;

performing denoising on coefficients in at least one of the plurality of decomposition levels;

modifying coefficients in at least two of the plurality of decomposition levels, to sharpen or smooth the coefficients, by scaling coefficients in at least two decomposition levels using different scale dependent parameters for each of the decomposition levels;

performing renormalization on coefficients; and

inverse transforming the coefficients.

36. (Original) The method defined in Claim 35 wherein the input data comprises image data.

37. (Original) The method defined in Claim 35 wherein modifying coefficients comprises multiplying each coefficient in one of the decomposition levels by a first scale dependent parameter and multiplying each coefficient in another of the decomposition levels by a second scale dependent parameter.

38. (Previously Presented) A method for processing input data that comprises image data, the method comprising:

decomposing the input data into a plurality of decomposition levels by applying a wavelet transform to the input data;

performing denoising on coefficients in at least one of the plurality of decomposition levels;

modifying coefficients in at least two of the plurality of decomposition levels by scaling coefficients in at least two decomposition levels using different scale dependent parameters for each of the decomposition levels;

performing renormalization on coefficients; and

inverse transforming the coefficients, wherein each of the different scale dependent parameters is determined according to the following formula:

$$\mu_j = 2^{j\alpha}$$

where the value of α indicates whether sharpening or smoothing is applied to coefficients and j indicates the particular scale.

39. (Original) The method defined in Claim 38 wherein sharpening is applied to coefficients if α is less than zero and smoothing is applied to coefficients if α is greater than zero.

40. (Previously Presented) The method defined in Claim 35 wherein modifying coefficients results in smoothing of coefficients for scale dependent parameters greater than a transition value and results in sharpening of coefficients for scale dependent parameters less than the transition value.

41. (Original) The method defined in Claim 40 wherein the transition value is 1.

42. (Original) The method defined in Claim 35 further comprising performing simultaneously denoising and sharpening by multiplying all coefficients in one of the decomposition levels above a predetermined threshold and setting other coefficients to a value near zero.

43. (Original) The method defined in Claim 42 wherein the value is zero.

44. (Original) The method defined in Claim 35 further comprising performing denoising as part of scaling coefficients by reducing all coefficients by a predetermined amount to a value near zero and then multiplying all coefficients in one of the decomposition levels above a predetermined threshold and reducing all coefficients by a predetermined amount to a value near zero.

45. (Original) The method defined in Claim 44 wherein the value is zero.

46. (Original) The method defined in Claim 35 further comprising coloring noise that remains after scaling coefficients.

47. (Original) The method defined in Claim 35 further company renormalizing coefficients by applying a scalar to coefficients in at least one decomposition level.

48. (Original) The method defined in Claim 47 wherein renormalizing coefficients is performed as part of scaling coefficients by multiplying coefficients in one of the decomposition levels by a scale dependent parameter chosen to achieve renormalization.

49. (Original) A method for processing input data comprising:

decomposing the input data into a plurality of decomposition levels by applying a wavelet transform to the input data; and

magnifying edges more than noise coefficients by multiplying coefficients in different decomposition levels with different scale dependent parameters.

50. (Previously Presented) A method for processing input data comprising:

decomposing the input data into a plurality of decomposition levels by applying a wavelet transform to the input data; and

smoothing selected coefficients more than non-selected coefficients by multiplying coefficients in different decomposition levels with different scale dependent parameters.

51. (Original) The method defined in Claim 50 wherein the selected coefficients comprise background coefficients.

52. (Original) The method defined in Claim 50 wherein the selected coefficients comprises constant regions

53. (Previously Presented) An apparatus for processing input data comprising:

means for decomposing the input data into a plurality of decomposition levels by applying a wavelet transform to the input data; and

means for modifying coefficients in at least two of the plurality of decomposition levels, to sharpen or smooth the coefficients, by scaling coefficients in the at least two decomposition levels using different scale dependent parameters for each of the decomposition levels.

54. (Original) The apparatus defined in Claim 53 wherein the input data comprises image data.

55. (Original) The apparatus defined in Claim 53 wherein the means for modifying coefficients comprises means for multiplying each coefficient in one of the decomposition levels

by a first scale dependent parameter and means for multiplying each coefficient in another of the decomposition levels by a second scale dependent parameter

56. (Previously Presented) An apparatus for processing input data comprising:

means for decomposing the input data into a plurality of decomposition levels by applying a wavelet transform to the input data; and

means for modifying coefficients in at least two of the plurality of decomposition levels by scaling coefficients in the at least two decomposition levels using different scale dependent parameters for each of the decomposition levels, wherein each of the different scale dependent parameters is determined according to the following formula:

$$\mu_j = 2^{j\alpha}$$

where the value of α indicates whether sharpening or smoothing is applied to coefficients, and j indicates a particular scale.

57. (Original) The apparatus defined in Claim 56 wherein means for modifying applies sharpening to coefficients if α is less than zero and applies smoothing to coefficients if α is greater than zero.

58. (Previously Presented) The apparatus defined in Claim 53 wherein modifying coefficients results in smoothing of coefficients for scale dependent parameters greater than a transition value and results in sharpening of coefficients for scale dependent parameters less than the transition value.

59. (Original) The apparatus defined in Claim 58 wherein the transition value is 1.

60. (Original) The apparatus defined in Claim 53 further comprising means for performing an inverse transform on coefficients after scaling has been performed.

61. (Original) The apparatus defined in Claim 53 further comprising means for denoising after applying the wavelet transform.

62. (Original) The apparatus defined in Claim 53 further comprising means for performing denoising as part of scaling coefficients by multiplying all coefficients in one of the decomposition levels above a predetermined threshold and setting other coefficients to a value near zero.

63. (Original) The apparatus defined in Claim 62 wherein the value is zero.

64. (Original) The apparatus defined in Claim 53 further comprising performing denoising as part of scaling coefficients by reducing all coefficients by a predetermined amount to a value near zero and then multiplying all coefficients in one of the decomposition levels above a predetermined threshold and reducing all coefficients by a predetermined amount to a value near zero.

65. (Original) The apparatus defined in Claim 64 wherein the value is zero.

66. (Original) The apparatus defined in Claim 53 further comprising means for renormalizing coefficients.

67. (Original) The apparatus defined in Claim 66 wherein the means for renormalizing coefficients comprises means for applying a scalar to coefficients in at least one decomposition level.

68. (Original) The apparatus defined in Claim 66 wherein the means for renormalizing coefficients operates as part of scaling coefficients by multiplying all coefficients in one of the decomposition levels by a scale dependent parameter chosen to achieve renormalization.

69. (Previously Presented) An article of manufacture having one or more recordable media storing executable instructions thereon which, when executed by one or more processing devices, cause the one or more processing devices to:

decompose input data into a plurality of decomposition levels by applying a wavelet transform to the input data; and

modify coefficients in at least two of the plurality of decomposition levels, to sharpen or smooth the coefficients, by scaling coefficients in the at least two decomposition levels using different scale dependent parameters for each of the decomposition levels.

70. (Original) The article of manufacture defined in Claim 69 further comprising instructions which, when executed by the one or more processing devices, cause the one or more processing devices to multiply each coefficient in one of the decomposition levels by a first scale dependent parameter and multiplying each coefficient in another of the decomposition levels by a second scale dependent parameter

71. (Previously Presented) An article of manufacture having one or more recordable media storing executable instructions thereon which, when executed by one or more processing devices, cause the one or more processing devices to:

decompose input data into a plurality of decomposition levels by applying a wavelet transform to the input data; and

modify coefficients in at least two of the plurality of decomposition levels by scaling coefficients in the at least two decomposition levels using different scale dependent parameters for each of the decomposition levels, wherein each of the different scale dependent parameters is determined according to the following formula:

$$\mu_j = 2^{j\alpha}$$

where the value of α indicates whether sharpening or smoothing is applied to coefficients and j indicates a particular scale.

72. (Original) The article of manufacture defined in Claim 71 wherein sharpening is applied to coefficients if α is less than zero and smoothing is applied to coefficients if α is greater than zero.

73. (Previously Presented) The article of manufacture defined in Claim 69 wherein modifying coefficients results in smoothing of coefficients for scale dependent parameters greater than a transition value and results in sharpening of coefficients for scale dependent parameters less than the transition value.

74. (Original) The article of manufacture defined in Claim 73 wherein the transition value is 1.

75. (Previously Presented) An apparatus for processing input data comprising:

a forward wavelet filter to convert the input data into coefficients in a plurality of decomposition levels;

a scaling unit to modifying coefficients in at least two of the plurality of decomposition levels, to sharpen or smooth the coefficients, by scaling coefficients in the at least two decomposition levels using different scale dependent parameters for each of the decomposition levels; and

an inverse wavelet filter coupled to the scaling unit.

76. (Original) The apparatus defined in Claim 75 wherein the input data comprises image data.

77. (Original) The apparatus defined in Claim 75 wherein the scaling unit multiplies each coefficient in one of the decomposition levels by a first scale dependent parameter and multiplies each coefficient in another of the decomposition levels by a second scale dependent parameter

78. (Previously Presented) An apparatus for processing input data comprising:

a forward wavelet filter to convert the input data into coefficients in a plurality of decomposition levels;

a scaling unit to modifying coefficients in at least two of the plurality of decomposition levels by scaling coefficients in the at least two decomposition levels using different scale dependent parameters for each of the decomposition levels; and

an inverse wavelet filter coupled to the scaling unit, wherein each of the different scale dependent parameters is determined according to the following formula:

$$\mu_j = 2^{j\alpha}$$

where the value of α indicates whether sharpening or smoothing is applied to coefficients and j indicates a particular scale.

79. (Original) The apparatus defined in Claim 78 wherein the scaling unit applies sharpening to coefficients if α is less than zero and applies smoothing to coefficients if α is greater than zero.

80. (Original) The apparatus defined in Claim 75 wherein modifying coefficients results in smoothing of coefficients for scale dependent parameters greater than a transition value and results in sharpening of coefficients for scale dependent parameters less than the threshold value.

81. (Original) The apparatus defined in Claim 80 wherein the transition value is 1.

82. (Previously Presented) A copier comprising:

an image source;

a classifier unit coupled to the image source;

a scaling unit coupled to the classifier unit comprising

a forward wavelet filter to convert the image data into coefficients in a plurality of decomposition levels,

a scaling unit to modifying coefficients in at least two of the plurality of decomposition levels, to sharpen or smooth the coefficients, by scaling coefficients in the at least two decomposition levels using different scale dependent parameters for each of the decomposition levels,

an inverse wavelet filter coupled to the scaling unit; and

a printer coupled to the scaling unit.

83. (Original) The copier defined in Claim 82 wherein the scaling unit multiplies each coefficient in one of the decomposition levels by a first scale dependent parameter and multiplies each coefficient in another of the decomposition levels by a second scale dependent parameter

84. (Previously Presented) A copier comprising:

an image source;

a classifier unit coupled to the image source;

a scaling unit coupled to the classifier unit comprising

a forward wavelet filter to convert the image data into coefficients in a plurality of decomposition levels,

a scaling unit to modifying coefficients in at least two of the plurality of decomposition levels by scaling coefficients in the at least two decomposition levels using different scale dependent parameters for each of the decomposition levels,

an inverse wavelet filter coupled to the scaling unit; and

a printer coupled to the scaling unit, wherein each of the different scale dependent parameters is determined according to the following formula:

$$\mu_j = 2^{j\alpha}$$

where the value of α indicates whether sharpening or smoothing is applied to coefficients and j indicates a particular scale.

85. (Original) The copier defined in Claim 84 wherein the scaling unit applies sharpening to coefficients if α is less than zero and applies smoothing to coefficients if α is greater than zero.

86. (Original) The copier defined in Claim 82 wherein modifying coefficients results in smoothing if one of the scale dependent parameters is greater than a transition value and results in sharpening if one of the scale dependent parameters is less than the threshold value.

87. (Original) The copier defined in Claim 86 wherein the transition value is 1.